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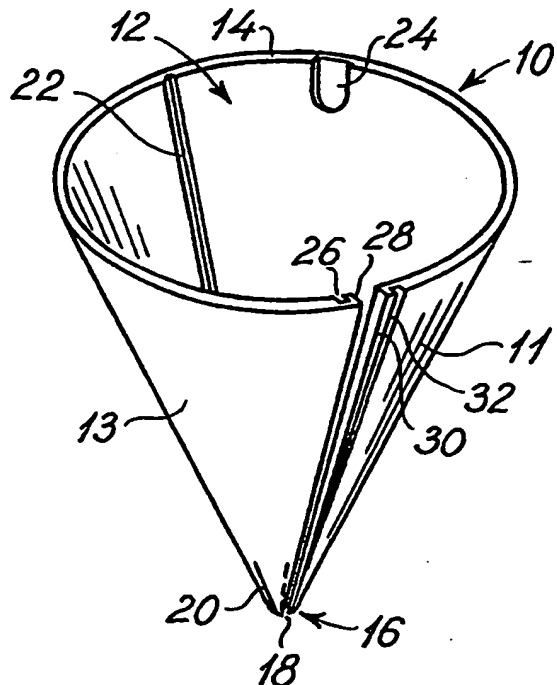
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(54) Title: **FITTING**

(57) Abstract

A fitting for covering the attachment of a wire to a surface comprises a hollow body which defines an outer, curved surface and an inner wire passage cavity, said body consisting of two parts which are movable relative to each other between a first position in which the body is open so that it may freely be placed about a wire, and a second position in which the body is closed so that it may be squeezed about a wire. In the open position the body consists of a blank which when closed provides a conical body, the apex of which is open and forms a wire passage with a clearance not exceeding the cross section of the wire the fitting is to cover. As a result, the fitting can safely and conveniently be placed and retained about a wire after the wire has been connected to an electric installation.



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**TITLE: FITTING**

The present invention relates to a fitting for covering the attachment of an electrical wire to a surface, preferably a ceiling surface.

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Various electric installations are installed hanging from a ceiling by one or more wires leading to the electric installation on a ceiling or wall surface, which may be provided with a connecting box. Examples of such electric installations may comprise lamps, such as pendant lamps and spots, information or display

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devices such as displays or television monitors, ventilators and loudspeakers. Particularly in connection with pendant lamps comprising an electrical bulb in a socket suspended from a wire attached to a ceiling surface, it is customary to cover the attachment to the ceiling by means of a fitting comprising a hollow body which defines an outer curved surface and an inner wire passage cavity.

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Traditionally, such fittings are in the shape of a thin-walled, frusto-conical body provided with a hole in the plane bottom for introducing the wire. To secure the fitting to the ceiling surface it is provided with supporting means which in the currently prevailing fittings are constituted by the plane bottom of the fitting,

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which is provided with a central hole fitting tightly around the wire. An example thereof is Swedish patent specification no. 200,070 which describes such a frusto-conical fitting, the plane bottom of which is a flexible membrane bulging in a direction opposite to that in which the fitting is moved on the wire. To enable such a construction to keep the fitting in place against a ceiling surface

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for a longer period of time, e.g. several years, the wire hole must be smaller than the wire, which however makes it difficult to insert the wire through the hole manually, namely in the case of fabric-covered wires, where the fabric cover tends to be held back when attempting to insert the wire through the hole in the plane bottom of the fitting. Therefore, in practice the wire hole will be

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enlarged, for example by the user by means of a knife, so that the wire may readily be inserted through the hole, with the result that often in time the fitting will slide slightly down the wire and thereafter hang askew, as it no longer abuts on a plane ceiling surface. It is also a disadvantage that the electrician must remember to mount the fitting on the wire before the electric installation is

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mounted on an electric outlet. Finally, there is the problem of fittings often being made of white plastic materials, such as polyethylene, which in time turn yellow and, as a consequence of this discoloration, no longer match a white

ceiling surface. Therefore, it is desirable that such a fitting can readily be changed without dismounting either the electric installation or the connection to the electric outlet.

- 5 The above-mentioned problems have to a large extent been solved by the fitting described in the specification of Danish patent application no. 921/94, said fitting comprising two parts which are movable relative to each other between a first position in which the body is open, so that the wire can be freely introduced in the cavity of the body, and a second position in which the body is closed and
- 10 fits tightly around the wire, so that the fitting may be retained against a ceiling surface. In a preferred embodiment the body is provided with a film hinge which the two parts are rotated about, and in its closed position the body has a frusto-conical shape.
- 15 The present invention breaks with the prejudice that a fitting must have a frusto-conical shape, and the invention teaches a fitting of a generally conical shape. Though desirable, a purely conical shape of the fitting known from the above-mentioned Swedish patent specification no. 200,070 would not be convenient, as the wire passage hole then would have to be at the apex of the cone, and then it
- 20 would not be possible to provide a flexible membrane which could bulge in a direction opposite to the one in which the fitting is moved on the wire. Furthermore, in practice it would be very difficult to insert a wire through such a hole in a direction from the apex of the cone to its bottom surface.
- 25 Thus, the present invention provides a fitting of the type described above, i.e. for covering the attachment of a wire to a surface, preferably a ceiling surface, which fitting in accordance with the invention is characterized in that it comprises a hollow body defining an outer curved surface and an inner wire passage cavity as well as a first and a second end, that the hollow body generally
- 30 converges from the first end towards the second end which defines a wire passage with a clearance or inner diameter which is smaller than the diameter of the wire the fitting is to cover, and that the hollow body at the second end and adjacent to the wire passage has a conical portion, the apex of which is open and forms said passage, thus providing a one-way wire passage blocking, so that the
- 35 fitting may be moved relative to the wire when the wire has been inserted through the wire passage, in a direction so that the wire can be moved from the first end towards the second end of the fitting, but is prevented from being

moved in the opposite direction from the second end towards the first end.

In accordance with the teaching of the invention it has surprisingly been found that a fitting, wherein the hollow body adjacent to the wire passage has a conical portion, provides a very advantageous blocking, so that the fitting and the wire only be moved in one direction relative to each other without having to use extensive physical force or even violence against the fitting and/or the wire, and consequently, they are moved in such a way that the wire after having been passed through the wire passage can be moved from the first end towards the second end of the fitting, corresponding to that the fitting manually or mechanically is moved along a wire towards a ceiling surface and, by means of the one-way blocking characterizing the invention, is retained in the intended position abutting on the ceiling surface. It has further been found that the fitting according to the present invention conveniently remains in its place, as during installation of the fitting according to the present invention it is possible to expose the wire for tension when the fitting is installed in the intended position abutting on the ceiling surface or another surface, said tension resulting in that the insulating material of the wire is elongated and then contracted resiliently, thus tightening the fitting to the surface it is mounted and abuts on.

20 In this connection the expression "a conical portion" means a general conical shape being distinct from the known frusto-conical fittings or parts of fittings which at said second end, i.e. the end containing the wire passage, are terminated by a plane wall which extends essentially perpendicular to the longitudinal direction of the wire and may serve as a supporting surface for an insertion bush, a pull relief or the like. By providing the fitting according to the invention with a conical portion adjacent to the wire passage there is obtained a safe and reliable locking and retainment of the fitting relative to the wire without the need for additional retaining devices such as insertion bushes, tension reliefs, etc., which complicate the fitting from a technical point of view and spoil it aesthetically. Thus, the present invention provides a fitting which contrary to most of the known fittings has a very harmonious transition from the wire to the fitting, the conical portion of the fitting providing an uninterrupted transition between the hollow body of the fitting and the wire and consequently being without abrupt and aesthetically disfiguring interruptions or transitions.

The fitting according to the present invention may be of arbitrary form per se,

converging from the first end towards the second end. Thus, in accordance with a first and preferred embodiment, the fitting according to the present invention configures the apex of a cone, i.e. the hollow body of the fitting is not only of general conical shape at the second end adjacent to the wire passage, but

5 configures the apex of a cone throughout the hollow body of the fitting. In accordance with alternative embodiments of the fitting according to the present invention the hollow body of the fitting configures the apex of a conical body which may constitute a rotationally symmetrical body or have other arbitrary geometrical generators, and the longitudinal section of which has straight

10 contours, curved contours including inwardly or outwardly curved contours relative to the inner wire passage cavity, or contours which are combinations of straight and curved segments, including outwardly and/or inwardly curved segments. Examples of curved segments which may define the hollow body of the fitting are hyperbolas, parabolas, circular segments, elliptical segments,

15 graphs for logarithmic functions, exponential functions and power functions.

To facilitate the mounting of the fitting according to the present invention relative to the wire and thus allow the fitting to be mounted on the wire without the wire having a free outer end which is introduced into the inner wire passage

20 cavity through the wire passage, whereby the fitting so to speak is threaded on the wire, the fitting according to the present invention is in accordance with the preferred embodiment of the fitting configured in such a way that the hollow body of the fitting comprises two parts which are movable relative to each other between a first position in which the body is open so that it may be freely placed

25 around a wire, and a second position in which the body is closed, thus providing the hollow body.

By departing from the traditional frusto-conical shape of a two-part fitting and instead providing a conical fitting, a first achievement is a well-defined area for

30 positioning the wire, viz. the apex of the cone, and there is no risk of positioning the wire wrongly, as may be the case in the above-mentioned two-part frusto-conical fitting. A second achievement is that it is easier to retain the fitting permanently abutting on a ceiling surface, as the conical shape causes the material squeezing the wire to abut naturally on the wire at an angle providing

35 substantial friction when moved away from the bottom surface of the cone towards its apex, i.e. away from the ceiling surface. A third achievement is that the fitting may easily be mounted at a height convenient to a person and at a

distance from the ceiling surface and then be pushed upwards to abut on the ceiling surface, the conical shape causing low friction when moved away from the apex of the cone towards its bottom plane. Furthermore, the conical shape allows the configuration of particularly advantageous locking means which i.a.  
5 in the closed position of the fitting may be released by pressing a part of the body in a radial direction.

The invention is not limited to fittings for covering a ceiling surface, but may also be used for covering the attachment of a wire to other types of surfaces,  
10 e.g. a wall.

Other advantages and possible uses of a fitting according to the invention will be specified in the following description.

15 For a fitting according to the invention to be readily supported by a wire, the wire passage provided at the apex of the conical body must have a clearance which preferably is narrower than the cross-section of the wire which the fitting is to cover.

20 As a rule, electrical wires are flexible, and it will therefore be possible for the fitting to be supported by a wire, if the material around the apex of the fitting is more rigid than the wire material, but preferably elastic, so that a given fitting may be used for wires having varying cross-sections. Preferred elastic materials are plastics or metal plates, as will be explained in more detail below.

25 Furthermore, the possibility of using a given fitting for wires having varying cross-sections is improved by the fact that the fitting according to a preferred embodiment of the invention in the area around the wire passage is slotted from the apex area of the cone to form a number of elastic tabs which can be squeezed around wires having varying cross-sections.

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The conical shape of the fitting makes it possible for it to be easily displaced in its closed position about a wire in a direction from the apex of the cone towards its bottom surface, but not in a direction from the bottom surface of the cone towards its apex. This implies that the fitting may be mounted about a wire at a  
35 height which is convenient for the person carrying out the mounting, whereafter the fitting may be closed and manually pushed upwards along the wire until it reaches the ceiling or another abutment surface where it will surround the wire

tightly without any risk of it sliding down, as is the case with known integral fittings having an uninterrupted frusto-conical shape with a central hole in the bottom.

- 5 On account of the easiness with which a fitting according to the invention may be mounted about a wire, the fitting may also be used for concealing and supporting an existing fitting which has slid down from the ceiling and is hanging askew, or which one wants to conceal because it consists of a plastic material which in time turns yellow. Alternatively, an existing fitting made of a
- 10 plastic material such as polyethylene may easily be cut into pieces with a knife and be removed from the place of suspension in order to be replaced by a fitting according to the invention, thereby avoiding a dismounting of the wire from the connection place or the electric installation.
- 15 The covering capacity of the cone, which depends on the size and shape of the cavity, may be varied as required by designing cones with varying bottom surface sizes and/or cone heights and, accordingly, varying cone apex angles. If the fitting is to cover an existing fitting, it must of course have a volume and shape that is able to contain the existing fitting. If the fitting is to be used for
- 20 covering the attachment of a wire to a wall, a cone with a low height and a large apex angle will probably be preferred. The term "conical shape" denotes a geometrical cone in its broadest sense, which implies that the bottom surface need not be circular, but may have any other shape appropriate for the purpose, and the generators of the cone need not follow straight lines, as they may
- 25 converge towards the apex following curved and broken lines, respectively. In the first case the fitting will have a double-curved surface, corresponding to a part of an ellipsoid, whereas the fitting in the second case may have the shape of a double cone. It is decisive for the technical effect of the fitting according to the invention that it converges towards its apex, providing a well-defined area for
- 30 the wire to be placed.

As mentioned, the present fitting consists of two parts which are movable relative to each other between a first position in which the body is open, so that it may freely be mounted about a wire, and a second position in which the body

35 is closed, so that it may be squeezed about a wire. The body may therefore consist of two halves which are preferably identical and along their respective generators are provided with locking means which allow the two halves to be



assembled and form the conical shape. However, it is preferred that the two parts of the body are mutually connected, either by means of a hinge member extending along a cone generator or by means of an uninterrupted part of the wall forming the outer, curved surface of the body.

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In the first case the hinge member provides an axis of rotation, which means that the two parts in a well-defined manner may be brought from the open position to the closed position, wherein the free lateral edges of each part of the body, when extending along cone generators, are brought to abut accurately on each other.

- 10 Said free lateral edges are provided with suitable locking means which may be similar to the ones described in the above-mentioned Danish patent specification no. 921/94, the present invention, however, providing a particularly advantageous configuration of the locking means, which will be described in more detail below. Said locking means are preferably in the form of snap
- 15 locking means so that the two parts of the body, when turned about the hinge member, may be brought to lock against each other by a tangential movement, as described in more detail below.

- According to the invention, the hinge member extending along a cone generator
- 20 is preferably a film hinge, in which case the body must be made of a plastic material suitable for forming the film hinge. Said plastic material suitable for forming the film hinge may be a polypropylene polymeric material, such as a copolymer of propylene and ethylene, but is preferably polypropylene. Other possible materials are polyoxymethylene (POM) and polybutylterephthalate
- 25 (PBT). The classical film hinge which e.g. is described in a technical leaflet issued by Hoechst Aktiengesellschaft, B.3.5 "Filmgelenke aus technischen Kunststoffen" is injection moulded in such a way that the polymer molecules are positioned in a thin layer transversely to the hinge member allowing the hinge to be opened and closed many times. For the present use of the fitting according to
- 30 the invention it is not necessary for the hinge member to be opened and closed many times, and the hinge member may therefore be in the form of a narrow area of reduced material thickness, e.g. one third of the surrounding material.

- When providing the fitting according to the invention with a hinge member
- 35 which connects said two parts of the body, it can in a first embodiment have the shape of an almost closed body provided with a slot of appropriate width between the free longitudinal sides of each of said two parts, said slot allowing

the insertion of a wire in the wire passage at the apex of the cone. Such a configuration has the advantage that in order to close the two parts of the fitting they only have to be moved a short distance relative to each other, thereby allowing the fitting to be easily mounted by use of only one hand. Alternatively, the fitting may have the shape of an entirely open body where the free longitudinal sides of the two parts are spaced far apart, e.g. on the same plane as the hinge, which will typically be the position in which the fitting is manufactured in case it is injection moulded with a film hinge.

- 10 As mentioned above, instead of being mutually connected by means of a hinge the two parts of the fitting may be mutually connected by means of an uninterrupted part of the wall forming the outer, curved surface of the body. In this embodiment the body may in its open position take any possible form, from a plane blank which may be raised to a conical shape to an almost closed body provided with a continuous slot between the free longitudinal sides of the two parts, allowing the introduction of a wire.

- When the two parts of the body are to be moved from the open position to the closed position, the geometry of the conical shape will often make the body more flexible at the end constituting the bottom surface of the cone than at the end constituting the cone apex. To compensate for the difference in flexibility it may be advantageous to provide the fitting with a substantial material thickness particularly at the end constituting the bottom surface of the cone, or with an increasing material thickness in the direction from the cone apex towards its bottom surface. Depending on the material the material thickness may vary from e.g. 0.3 mm at the cone apex to 3 mm at the bottom surface of the cone, preferably from 0.5 mm to 1.5 mm. A different or supplementary technique for compensating for the varying flexibility caused by the conical shape consists in providing reinforcing ribs on planes parallel to and preferably in the vicinity of the bottom surface of the cone.

- As mentioned above, along its free longitudinal sides and in a generator direction the fitting is preferably provided with mutually cooperating snap locking means which may be brought to engage with each other by moving the two parts of the body towards each other. According to the invention particularly advantageous snap locking means are in the form of opposite hook means which are brought to lockingly engage with each other when the body is

moved from the open to the closed position. In a particularly advantageous embodiment the locking means may be provided with mutually corresponding inclined abutting surfaces designed to slide towards each other when the body is moved from an open to a closed position, thereby displacing the locking means  
5 on said two parts in the direction of the inclined abutting surfaces until the snap closure position is reached. Snap locking means of this type imply that the fitting may be operated with one hand so that the two parts slide into place in a tangential movement and lock each other. If one wishes to open the fitting later on, this may be achieved by applying pressure in a radial direction to one of said  
10 two parts constituting the body.

The said snap locking means are not limited to use in connection with a conical fitting according to the invention, but may be used in connection with any two-part fitting, including the one described in the above-mentioned Danish patent  
15 application no. 921/94. In the case of a two-part frusto-conical fitting, however, it is not so easy to achieve an opening by applying a pressure in a radial direction, because the bottom of the frusto-conical body limits the possibilities of applying a radial pressure.

20 In the following the invention is described in more detail with reference to the drawing, in which:

Fig. 1 shows a fitting according to the invention with a hinge member,  
Fig. 2 shows a fitting according to the invention with an uninterrupted

25 wall part,

Fig. 3 shows snap locking means according to a preferred embodiment of the invention,

Fig. 4 shows the apex area of a conical fitting according to the invention placed around a wire,

30 Fig. 5 shows a part of a wall of a fitting according to the invention having a varying material thickness,

Fig. 6 shows a further embodiment according to the invention, in which the fitting in its open position is constituted by a plane blank,

Fig. 7 shows a section through Fig. 6 along line 7-7,

35 Fig. 8 shows an embodiment of a fitting according to the invention with a snap closure formed in connection with a hinge member,

Fig. 9 shows the fitting according to Fig. 8 in an almost closed position in

which the snap hinge is closed,

Fig. 10 shows an embodiment of a fitting according to the invention, with a double-curved surface, and

Fig. 11 shows an embodiment of a fitting according to the invention in the form of a double cone.

Fig. 1 is a schematical view of a first embodiment of a fitting according to the present invention, which in its entirety is designated the numeral 10. The fitting is shown in a partially open position. The fitting 10 comprises a rotationally symmetrical and substantially conical body, which is designated the numeral 11 in its entirety and defines an inner wire passage cavity 12, an upper, circumferential circular edge or margin 14 and an opposite apex area 16 provided with a circular wire passage aperture 18.

The body 11 of the fitting comprises two adjacent parts or surface elements 11 and 13 which are connected by means of a hinge 22. The hinge 22 extends along a generator of the conical body 10 between the upper edge 14 and the wire passage aperture 18. The hinge 22 may consist of a so-called film hinge, in which case the fitting 10 is preferably manufactured by injection moulding of a polypropylene material which is known for providing film hinges. In this case the film hinge will be a narrow strip of material having a width of e.g. 1-2 mm and a thickness of e.g. 0.1-0.3 mm and wherein the polymer molecules, due to the use of an injection moulding technique, extend perpendicular to the axis of rotation formed by the hinge 22. In practice, however, a film hinge is not required, as it will not be necessary to open and close the hinge many times, and the hinge may be provided by the material in the desired hinge area having a thickness which e.g. is one third of the thickness of the surrounding material. Also in the latter case a polypropylene material will be suitable, one of the characteristics of polypropylene being that it may be bent about a reference line without breaking.

Together with the hinge 22, the parts 11 and 13 form a thin-walled fitting body 10 which may be assembled to form a closed conical fitting provided with a circular hole in the apex of the cone, in which a wire may be placed before the body is closed. In the closed position the two parts 11 and 13 of the fitting body are retained abutting on each other by means of cooperating locking means 26, 28, 30, 32, which are provided in the respective free lateral edges of the parts

11 and 13. To achieve snap locking with surface part 11 surface part 13 is provided with an elongated track 26 defined by a flange 28, and surface part 11 is correspondingly provided with a flange 30 defining an elongated track 32. The flange 30 on the surface 11 is designed to engage with the track 26 on the surface part 13, and the flange 28 on the surface part 13 is designed to engage with the track 32 on the surface part 11. Alternatively, the surface parts may be retained in the closed position by the means described and shown in the above-mentioned Danish patent application no. 921/94, or the surface parts may be retained by snap locking means, as explained in more detail below in connection with Fig. 3. Reference numeral 24 indicates a weakening line close to the upper edge 14 of the fitting, which line allows the provision of recesses through which a wire may be passed from the wire passage cavity 12 to a lamp outlet or a similar electric connection point, e.g. on a wall. Finally, slots 20 are indicated in the apex area 16 of the cone resulting in the formation of a number of tabs which can expand the diameter of the wire passage aperture 18 corresponding to the diameter of the topical wire. Alternatively, the material thickness may be diminished in the apex area of the cone.

The fitting shown in Fig. 1 functions in such a way that it is placed around a wire in its open position and with the apex of the cone pointing downwards, said wire being suspended from a ceiling and already having a lamp mounted at its other end. The surface parts 11 and 13 are moved towards each other with one hand until the snap locking means 26, 28, 30, 32 lock the surface parts 11 and 13 to each other. This movement is easily achieved, as the two surface parts 11 and 13 turn around the hinge 22. In the locked position the wire passes through the wire passage aperture 18, the clearance of which may not be larger than the cross-section of the topical wire. Due to the geometry of the cone the apex area 16 will in the closed position abut on the wire at an inclined angle causing friction in a downward direction, i.e. the direction from the bottom surface of the cone towards its apex. By means of the tabs 20 the apex area 16 is able to adapt to varying wire diametres, and there will always be created a frictional force which prevents the fitting from moving down the wire by its own weight. Conversely, it is easy to push the fitting manually upwards on the wire until the upper circular edge 14 abuts on the ceiling surface from which the lamp is suspended by its wire. Due to the squeezing effect or friction in the wire passage aperture 18 the fitting body 10 can even be retained against the ceiling surface with a certain bias obtained by pulling the wire downwards while retaining the

fitting against the ceiling surface.

Fig. 2 shows a second embodiment of a fitting according to the invention, which differs from the embodiment in Fig. 1 in that the hinge 22 is replaced by an  
5 uninterrupted wall part 15 relative to which the two surface parts 11 and 13 may be moved towards each other, optionally bending the uninterrupted wall part 15. Furthermore, Fig. 2 shows a circumferential reinforcing flange 40 extending along the upper edge 14, the effect of said reinforcing flange 40 being that the fitting material is rendered less flexible above when the two surface parts 11 and  
10 13 are moved towards each other to the closed position. A corresponding flange may be provided on the fitting shown in Fig. 1.

Whether the fitting is formed with a hinge as shown in Fig. 1 or with an uninterrupted wall part as in Fig. 2 depends to a certain extent on the rigidity of  
15 the material the fitting is made of, and on the ability of the material to form or be part of a hinge. As mentioned, the embodiment shown in Fig. 1 may advantageously be made of a polypropylene material, and the embodiment shown in Fig. 2 may advantageously be made of a polycarbonate.

20 Fig. 3 shows a preferred embodiment of the snap locking means between the free lateral edges of the respective surface parts 11 and 13 shown in Figs. 1 and 2. In the embodiment shown in Fig. 3 the flanges corresponding to the flanges 28 and 30 of Fig. 1 and 2 are designated 28' and 30', respectively, and the tracks corresponding to the tracks 26 and 32 are designated 26' and 32',  
25 respectively. As may be seen, the flange 28' is provided with an inclined abutting surface which is parallel to a corresponding inclined abutting surface on the flange 30'. When the two surface parts 11 and 13 are moved from an open position in the direction of arrows A and B the inclined abutting surfaces initially meet each other, and when the parts have been joined completely they  
30 will fall in place in the snap closure position. This snap closure may be opened again by a pressure on the surface part 11 in the direction of arrow C. Correspondingly, the embodiments shown in Figs. 1 and 2 may be opened by a pressure on the corresponding surface part 11 in a radial direction. This means that a fitting according to the invention may be easily dismounted or that it may  
35 easily be reopened if it is closed by accident.

Accordingly, compared to the existing fittings there is no problem in mounting a

fitting according to the present invention after the lamp has been installed, and dismount it with the lamp suspended. By experimenting with different sizes and apex angles of the fitting according to the invention it is possible to find the best size for a given installation, also for covering an already existing traditional  
5 fitting which hangs askew at a certain distance from the ceiling or has turned yellow.

As mentioned above the fitting according to the invention is reinforced by means of a reinforcing flange along the upper edge. Fig. 5 shows other options for  
10 compensating the varying flexibility which is due to the varying diameter of the cone from a large diameter at the upper edge 14 to a small diameter in the apex area 16. Without compensation a stronger force will be needed to move the two surface parts 11 and 13 into a closed position in the apex area 16 than in the bottom surface area of the cone, which is defined by the upper edge 14. To  
15 counteract these differences the fitting may be provided with a varying wall thickness, as indicated in Fig. 5, where the wall thickness may decrease from the upper edge 14 to the apex 16 as shown. Alternatively or supplementary reinforcing ribs may be provided in the vicinity of the upper edge 14 as shown by the reference numerals 36, 38 and 40.

20 Figs. 6 and 7 show another embodiment of a fitting according to the invention, constituting a flat body in its open position which may be folded in the manner of a cornet to form a conical fitting, which, as shown in Fig. 7, is provided with flanges 28, 30 and tracks 26, 32 along its free lateral edges, corresponding to  
25 those shown in Figs. 1 and 2. This embodiment corresponds to the embodiment in Fig. 2, but in an unfolded position, where the respective surface parts 11 and 13 are mutually connected by means of an uninterrupted wall part 15. To facilitate the folding of the blank there are further provided reinforcing ribs 42, 44 and 46 extending along generators of the cone which is formed when the snap  
30 locking means 26, 28, 30 and 32 are lockingly engaged with each other.

Figs. 8 and 9 show a further embodiment of a fitting according to the invention. This fitting corresponds to the one shown in Fig. 1 in that it comprises two surface parts 11 and 13 interconnected by a hinge member 22, said hinge  
35 member, similar to the embodiment shown in Fig. 1, being a film hinge or other hinge type constituting an axis of rotation for the two curved surface parts 11 and 13. As a special feature this fitting comprises a snap closure in the form of a

clamp 48 fastened to the surface parts 11 and 13 by means of connecting edges 52 and 50, respectively. The connecting edges 50 and 52 may per se be in the form of film hinges. The clamp 48 has the same curvature as the corresponding part of the closed cone shown in Fig. 9. The fitting shown in Fig. 8 is closed by  
5 turning the two surface parts 11 and 13 around the hinge 22, so that the free lateral edges comprising snap closing means 26, 28 and 30, 32, respectively, move towards each other. Thus the clamp 48 comprising the curved lateral edges 54 and 56, respectively, will be straightened until the fitting reaches an unstable position of equilibrium in which the clamp is straightened to a  
10 maximum, and by continuously turning the two surface parts 11 and 13 around the hinge 22 they will snap from the unstable position of equilibrium into a closed or almost closed position, as shown in Fig. 9. In this embodiment the snap closing means 26, 28 and 30, 32, respectively, may be dispensed with, as the snap closing function of the clamp 48 causes the two surface parts 11 and 13  
15 to abut tightly on each other.

Fig. 10 shows yet another embodiment of the fitting according to the present invention, which in its entirety is designated the numeral 10. The embodiment shown in Fig. 10 differs from the previously described embodiments in that the  
20 body of the fitting is curved in two directions and has substantially the shape of a part of an ellipsoid. Such a shape is also construed as a conical shape, as in its closed position it converges towards the apex area 16 and defines a circular wire passage aperture 18, which may be squeezed about a wire. As a special feature it is noted that the two double-curved surface parts 58 and 60 are connected to  
25 each other by a hinge member 22 curving along a generator on the surface of the body. The curvature of the hinge member 22 causes the fitting to be movable from an entirely open position to an unstable position of equilibrium followed by a snap effect, and accordingly, actual snap locking means along the free lateral edges become superfluous.

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Correspondingly, Fig. 11 shows a conical fitting which is composed of conical surfaces 62, 64, 66 and 68 connected to each other by the hinge member 22 which forms a broken line and may therefore, similar to the embodiment in Fig. 10, be closed with a snap effect.

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Although the above invention has been described with reference to a number of presently preferred embodiments of the fitting it is obvious for a person skilled



in the art that the scope of the invention as defined in the following patent claims may comprise numerous alterations and modifications without departing from the spirit and purpose of the invention. The above-mentioned embodiments may further be combined in an arbitrary way, as elements or features specific to one  
5 embodiment may directly be incorporated in another embodiment. Similarly, the fitting may be made from two entirely separate parts with respective locking means along the free lateral edges, as long as these two parts are assembled to form a cone.

**WE CLAIM:**

1. A fitting for covering the attachment of a wire to a surface, preferably a ceiling surface, **CHARACTERIZED** in that the fitting comprises a hollow body  
5 defining an outer curved surface and an inner wire passage cavity as well as a first and a second end, that the hollow body generally converges from the first end towards the second end which defines a wire passage with a clearance or inner diameter which is smaller than the diameter of the wire the fitting is to cover, and that the hollow body at the second end and adjacent to the wire  
10 passage has a conical portion, the apex of which is open and forms said passage, thus providing a one-way wire passage blocking, so that the fitting may be moved relative to the wire when the wire has been inserted through the wire passage, in a direction so that the wire can be moved from the first end towards the second end of the fitting, but is prevented from being moved in the opposite  
15 direction from the second end towards the first end.
2. A fitting according to claim 1, **CHARACTERIZED** in that the hollow body of the fitting has the shape of a cone.
- 20 3. A fitting according to claim 1, **CHARACTERIZED** in that the hollow body of the fitting has the shape of the apex of a conical body, preferably a rotationally symmetrical body, the longitudinal section of which has straight, inwardly or outwardly curved contours or contours which are combinations of straight and outwardly and/or inwardly curved segments.
- 25 4. A fitting according to claims 1 to 3, **CHARACTERIZED** in that the hollow body of the fitting comprises two parts which are movable relative to each other between a first position in which the body is open so that it may be freely placed around a wire, and a second position in which the body is closed,  
30 thus providing the hollow body.
5. A fitting according to claims 1 to 4, **CHARACTERIZED** in that it is made from an elastic material.
- 35 6. A fitting according to claim 5, **CHARACTERIZED** in that it is made by injection moulding of plastics or by bending and/or compressing a metal plate.

7. A fitting according to claim 6, CHARACTERIZED in that it is made by injection moulding of a propylene polymeric material, preferably polypropylene.
8. A fitting according to claims 1 to 7, CHARACTERIZED in that the area  
5 around the wire passage is slotted from the apex area of the cone to form a number of elastic tabs which can be squeezed around wires having varying cross-sections.
9. A fitting according to claims 4 to 8, CHARACTERIZED in that said two  
10 parts are connected to each other by a hinge member extending along a cone generator.
10. A fitting according to claim 9, CHARACTERIZED in that the hinge  
15 member is a film hinge, and that the body is made from a plastic material providing film hinges.
11. A fitting according to claims 9 or 10, CHARACTERIZED in that a snap  
hinge is established having the hinge as an axis of rotation so that the body may  
20 be moved from an open position to a more closed position via an unstable position of equilibrium.
12. A fitting according to claim 11, CHARACTERIZED in that the snap  
hinge is established in a section of the cone surface and comprises a curved  
25 plastic clamp protruding from the cone surface and having the same radius of curvature as the respective section of the cone surface, said clamp being formed symmetrically about and essentially perpendicular to the film hinge with each of its two ends continueing into the corresponding part of the body, optionally through further hinges.
- 30 13. A fitting according to claim 11, CHARACTERIZED in that the snap hinge function is achieved by the hinge extending along a curved or broken line.
14. A fitting according to claims 4-8, CHARACTERIZED in that said two  
35 parts are connected to each other by a uninterrupted part of the wall forming the outer, curved surface of the body.
15. A fitting according to claim 14, CHARACTERIZED in that the material

thickness of the body is greater in the area around the base of the cone than in the area around the cone apex.

16. A fitting according to claims 4-15, CHARACTERIZED in that the body  
5 in its open position is constituted by a plane blank which may be bent to form a cone.

17. A fitting according to claims 4-15, CHARACTERIZED in that in its open  
10 position the body is provided with a continuous slot extending between two generators, the narrowest opening of which allows the introduction of a wire.

18. A fitting according to claim 17, CHARACTERIZED in that the lateral  
edges of the body adjacent to the slot are provided with means for locking said  
two parts in said second, closed position.

15

19. A fitting according to claim 18, CHARACTERIZED in that the locking  
means are constituted by cooperating snap locking means on each of said two  
parts, said snap locking means being in the form of opposite hook means being  
lockingly engaged with each other when the body is moved from an open to a  
20 closed position.

20. A fitting according to claim 19, CHARACTERIZED in that the locking  
means are provided with mutually corresponding inclined abutting surfaces  
designed to slide towards each other when the body is moved from an open to a  
25 closed position, thereby moving the locking means on said two parts in the  
direction of the inclined abutting surfaces until the snap closure position is  
reached.

21. A fitting according to claim 20, CHARACTERIZED in that the hook  
30 means are designed so that the body may be moved from the closed position to  
an open position by applying a pressure in a radial direction on one of said two  
parts forming the body.

22. A fitting for covering the attachment of a wire to a surface, preferably a  
35 ceiling surface, CHARACTERIZED in that the fitting comprises a hollow body  
defining an outer curved surface and an inner wire passage cavity, said body  
comprising two parts which are movable relative to each other between a first

position in which the body is open so that it may be freely placed about a wire, and a second position in which the body is closed, so that it may be squeezed about a wire, and that the body furthermore is provided with means for locking said two parts in said second, closed position, said locking means consisting of cooperating snap locking means provided on each of said two parts and in the form of opposite hook means which are caused to lockingly engage with each other when the body is moved from an open to a closed position.

23. A fitting according to claim 22, CHARACTERIZED in that the locking means are provided with mutually corresponding inclined abutting surfaces designed to slide towards each other when the body is moved from an open to a closed position, thereby moving the locking means on said two parts in the direction of the inclined abutting surfaces until the snap closure position is reached.

24. A fitting according to claim 23, CHARACTERIZED in that the hook means are designed so that the body may be moved from the closed position to an open position by applying a pressure in a radial direction on one of said two parts forming the body.

25. A fitting according to claims 22-24, CHARACTERIZED in that the body in the open position is constituted of a blank which when closed provides a conical body, the apex of which is open and forms a wire passage with a clearance not exceeding the cross-section of the wire the fitting is to cover.

26. A fitting according to claim 25, CHARACTERIZED in that said two parts are connected to each other by a hinge member extending along a cone generator.

27. A fitting according to claim 26, CHARACTERIZED in that the hinge member is a film hinge, and that the body is made from a plastic material suitable for film hinges.

28. A fitting according to claims 25-27, CHARACTERIZED in that in its open position the body is provided with a continuous slot extending between two generators, and that the locking means extend along the lateral edges adjacent to the slot.

Fig. 1

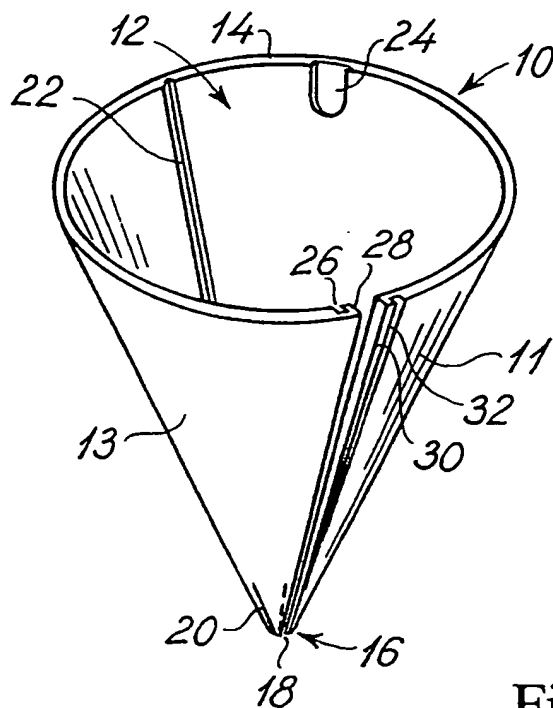


Fig. 2

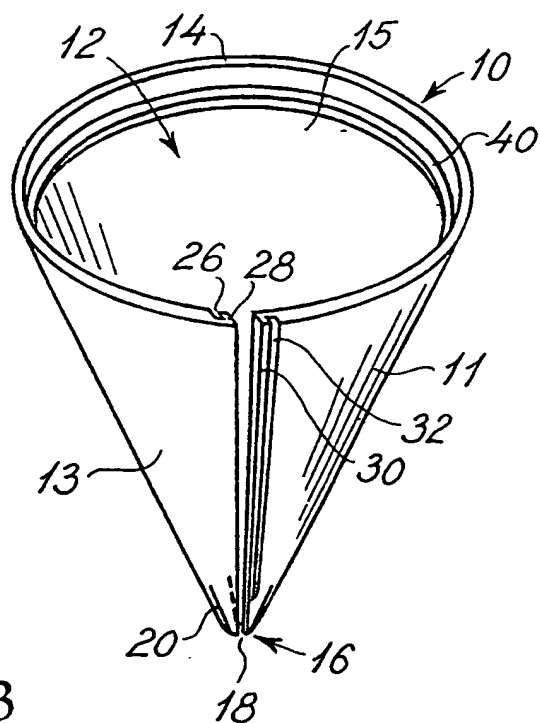


Fig. 3

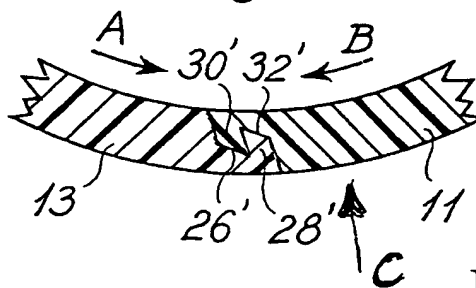


Fig. 4

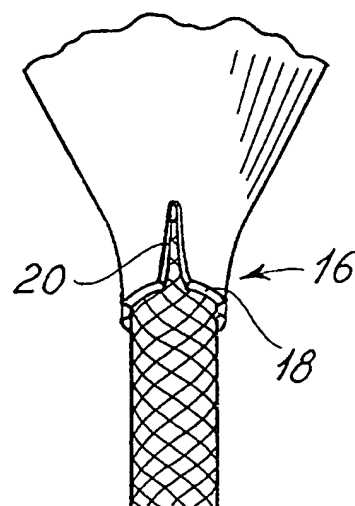
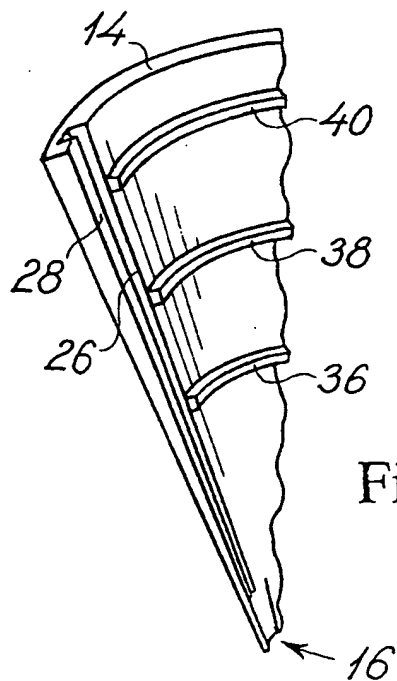


Fig. 5



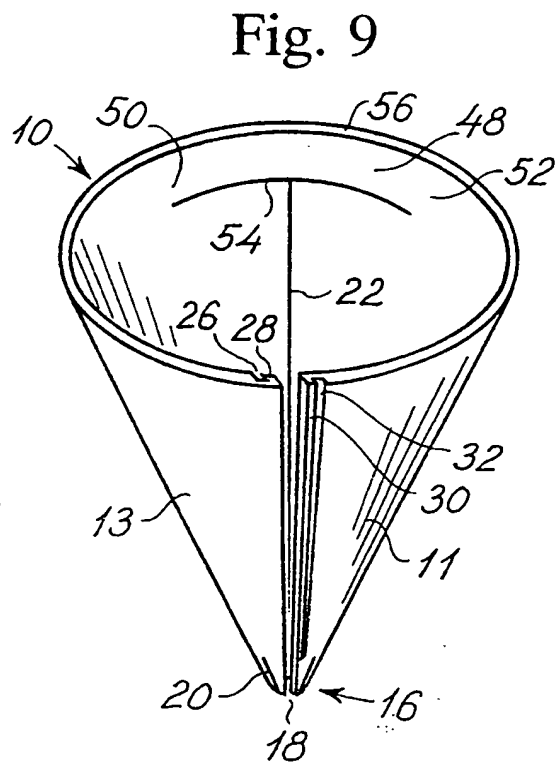
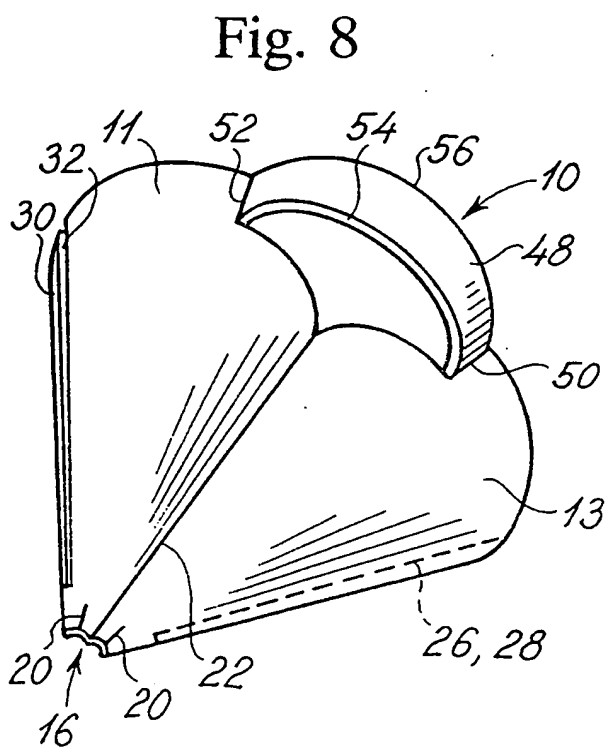
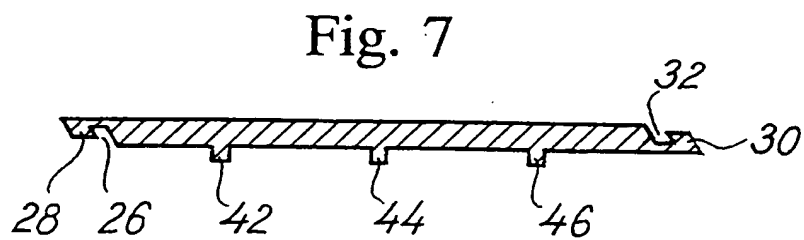
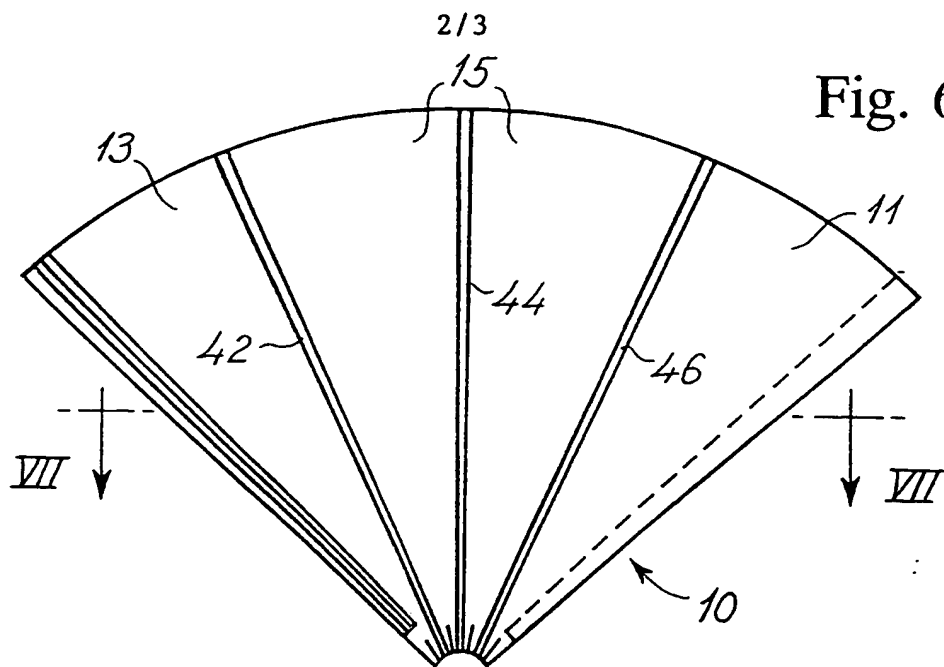


Fig. 10

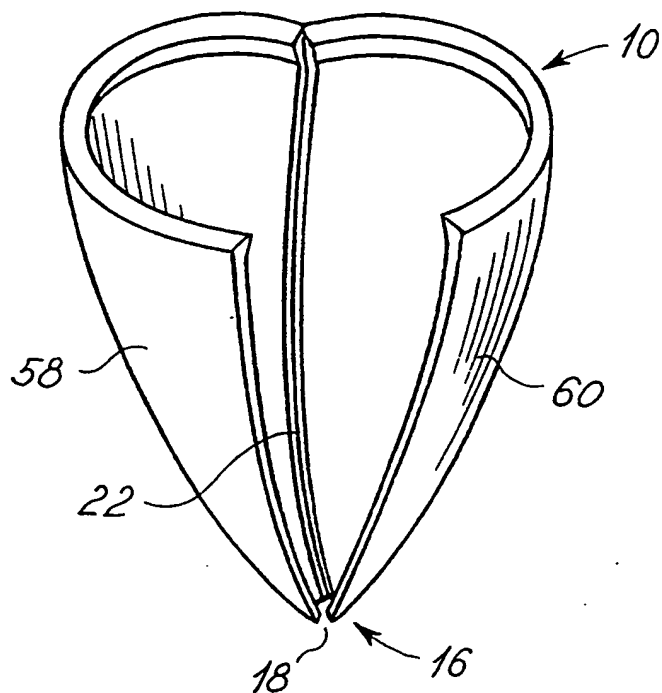
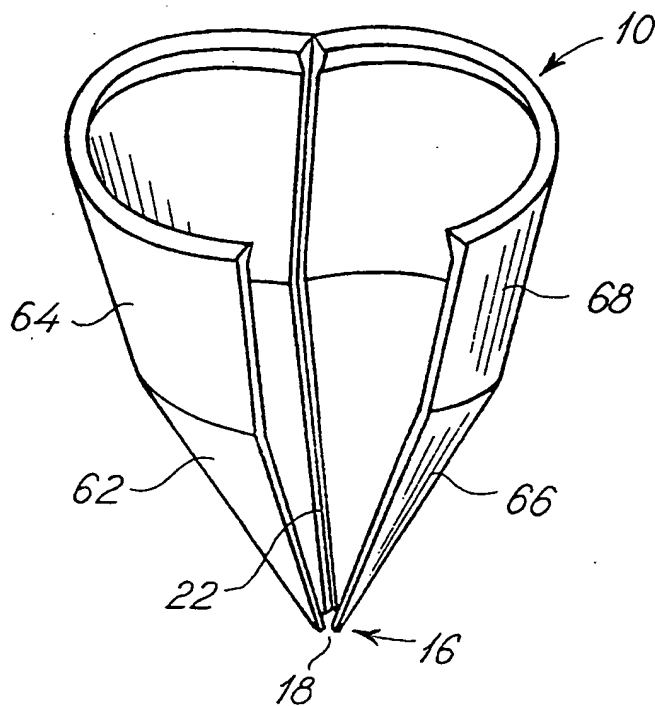


Fig. 11





# INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 96/00275

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC6: F21V 21/02, H02G 3/20 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols)		
IPC6: F21V, H02G		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
SE,DK,FI,NO classes as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DK 940921 A (VIBEKE KJERRUMGAARD), 10 February 1995 (10.02.95), figures 8,9 --	1-7,9,10,14, 16-28
A	GB 202056 B (ALFRED BUSHELL), 15 August 1923 (15.08.23) --	
A	US 1044063 A (HENRY LEIK), 12 November 1912 (12.11.12), figure 2 -- -----	
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
25 Sept. 1996		27 -09- 1996
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86		Authorized officer Axel Lindhult Telephone No. +46 8 782 25 00

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/DK 96/00275

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DK-A-	940921	10/02/95	NONE	
GB-B-	202056	15/08/23	NONE	
US-A-	1044063	12/11/12	NONE	